Stoller
Grand Junction Office established 1959

299-W11-66 (A7308)
Log Data Report

Borehole Information:

Borehole: 299-W11-66 (A7308)			**Site:** 216-T-6 Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:**	Not deep enough	**GWL Date:**	1/13/2003
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
136,652.49 m	567,182.64 m	August 1951	216.317 m	75	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	1.4	8 5/8	8	11/32	1.4	72

The logging engineer measured the casing stick up using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape. Measurements were rounded to the nearest 1/16 in. Casing thickness was calculated. An accurate measurement of the inside diameter is not possible. The south side of the casing is crushed inward almost 2 in., causing a severe out-of-round distortion of the opening.

Borehole Notes:

Borehole coordinates, elevation, and well construction information are from measurements by Stoller field personnel, HWIS[3], and Chamness and Merz (1993). Zero reference is the top of the 8-in. casing. Top of casing is cut unevenly, and the opening has been partially crushed shut. A reference point survey "X" is located at the top of the casing stickup.

Logging Equipment Information:

Logging System:	Gamma 2A		**Type:** SGLS (35%)
Calibration Date:	9/2002	**Calibration Reference:**	GJO-2002-383-TAC
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2/Repeat**		**4**	
Date	1/29/03	1/29/03			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	74.5	44.5			
Finish Depth (ft)	1.5	35.5			
Count Time (sec)	200	200			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A[4]	N/A			
Pre-Verification	BA189CAB	BA189CAB			

Log Run	1	2/Repeat		4	
Start File	BA189000	BA189074			
Finish File	BA189073	BA189083			
Post-Verification	BA189CAA	BA189CAA			
Depth Return Error (in.)	0	0			
Comments	Fine-gain adjustment after file BA189012.	No fine-gain adjustment.			

Logging Operation Notes:

Zero reference was top of the 8-in. casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 082. During SGLS logging, one fine-gain adjustment was needed to maintain the 1460-keV (^{40}K) photopeak at a pre-described channel. Prior to logging, the sonde was run up and down the borehole one time to displace any radon gas if present.

Analysis Notes:

Analyst:	Sobczyk	Date:	02/24/03	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of the day. The verification spectra were all within the control limits that were established on 12/05/2002. The peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were between 2 and 4 percent lower at the end of the day.

Log spectra for the SGLS were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G2AFEB03.xls), using parameters determined from analysis of recent calibration data. Zero reference was the top of the 8-in. casing. On the basis of Chamness and Merz (1993), the casing configuration was assumed to be one string of 8-in. casing to total depth (74.5 ft). The casing correction factor was calculated assuming a casing thickness of 11/32 in. This casing thickness is based upon the field measurement. A water correction was not needed or applied to the data. Dead time corrections are required when dead time exceeds 10.5 percent. As the dead time did not exceed 10.5 percent, a dead time correction was not needed or applied.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 1764 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 609 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was measured near the ground surface (1.5 ft) with a concentration of 0.9 pCi/g. ^{137}Cs was measured near the bottom of the borehole (74.5 ft) with a concentration of 2.3 pCi/g. ^{137}Cs was also measured slightly above the MDL (0.2 pCi/g) at 40.5 ft.

Recognizable changes in the KUT logs occurred in this borehole. Changes of 4 pCi/g or more in apparent ^{40}K concentrations occur at approximately 20 and 26 ft. Above 20 ft, ^{40}K concentrations are relatively low, which may indicate a surface seal of grout around the borehole. The increase in ^{40}K concentrations at about 36 ft may represent the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data for the man-made radionuclides and natural radionuclides (662, 609, 1461, 1764, and 2614 keV) except for the log depth of 40.5 ft. The ^{137}Cs concentration based on the 662-keV photopeak does not repeat at 40.5 ft.

Gross gamma logs from Fecht et al. (1977) (attached) indicate that the sediments surrounding this borehole contained only background amounts of gamma radiation from 1963 through at least 1976. The logs from 4/26/63 and 5/6/76 appear to detect only natural gamma activity. The SGLS detected low levels of ^{137}Cs at the ground surface and the bottom of the borehole.

References:

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles from 200 Area Crib Monitoring Wells*, ARH-ST-156, Atlantic Richfield Hanford Company, Richland, Washington.

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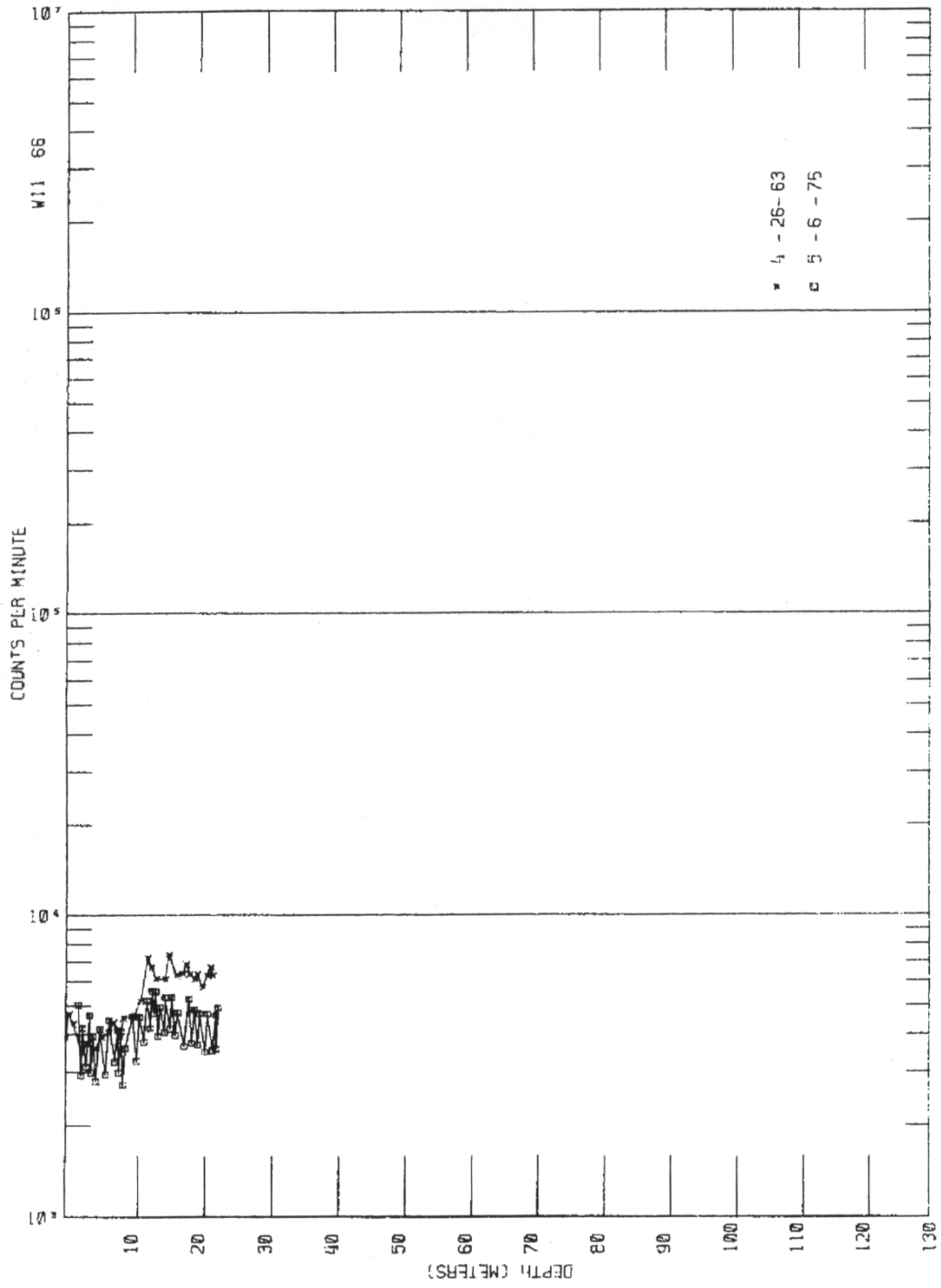
[1] GWL – groundwater level
[2] TOC – top of casing
[3] HWIS – Hanford Well Information System
[4] N/A – not applicable

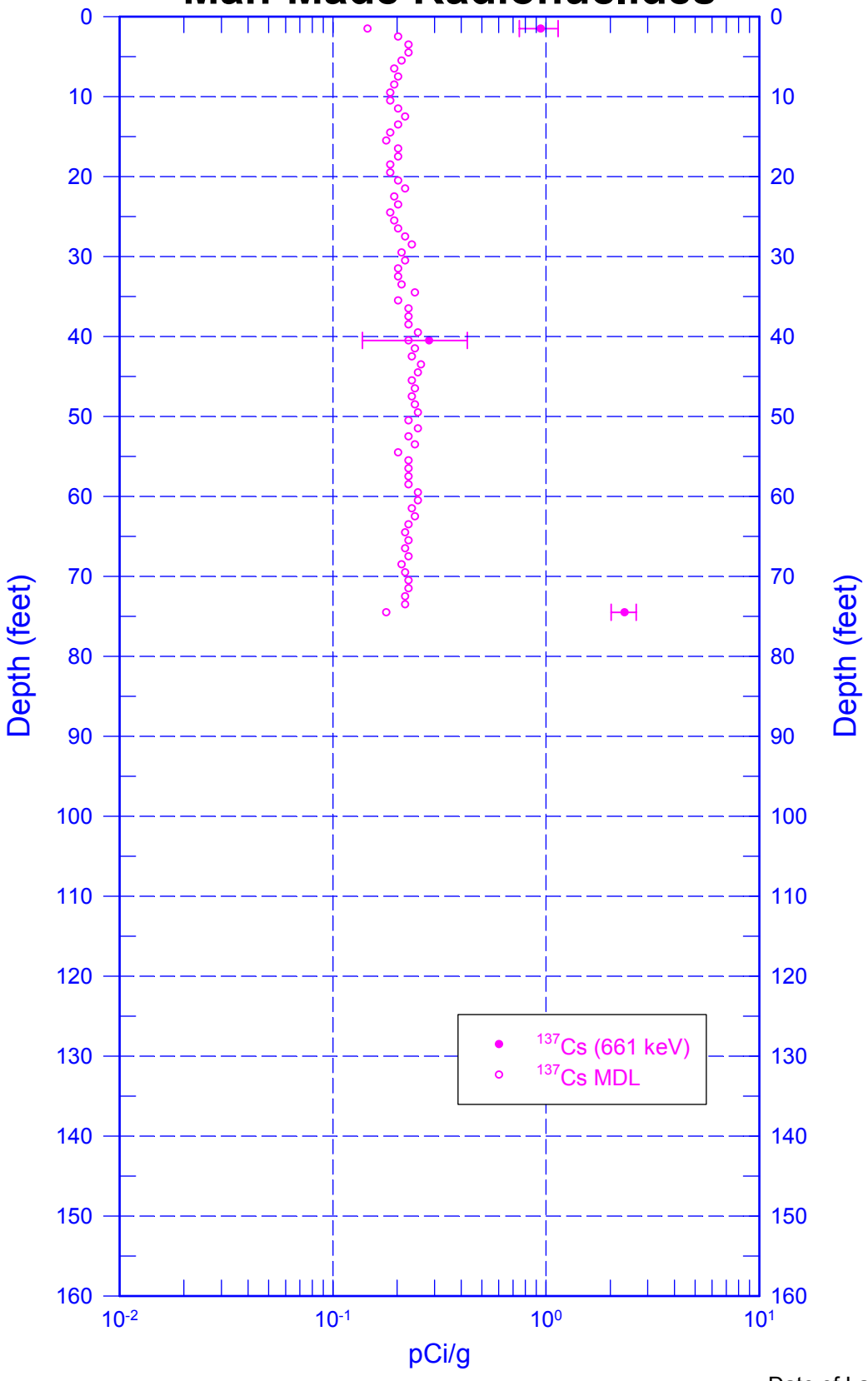


from Fecht et al. (1977)

Scintillation Probe Profiles for Borehole 299-W11-66, Logged on 4/26/63 and 5/6/76

299-W11-66 (A7308)

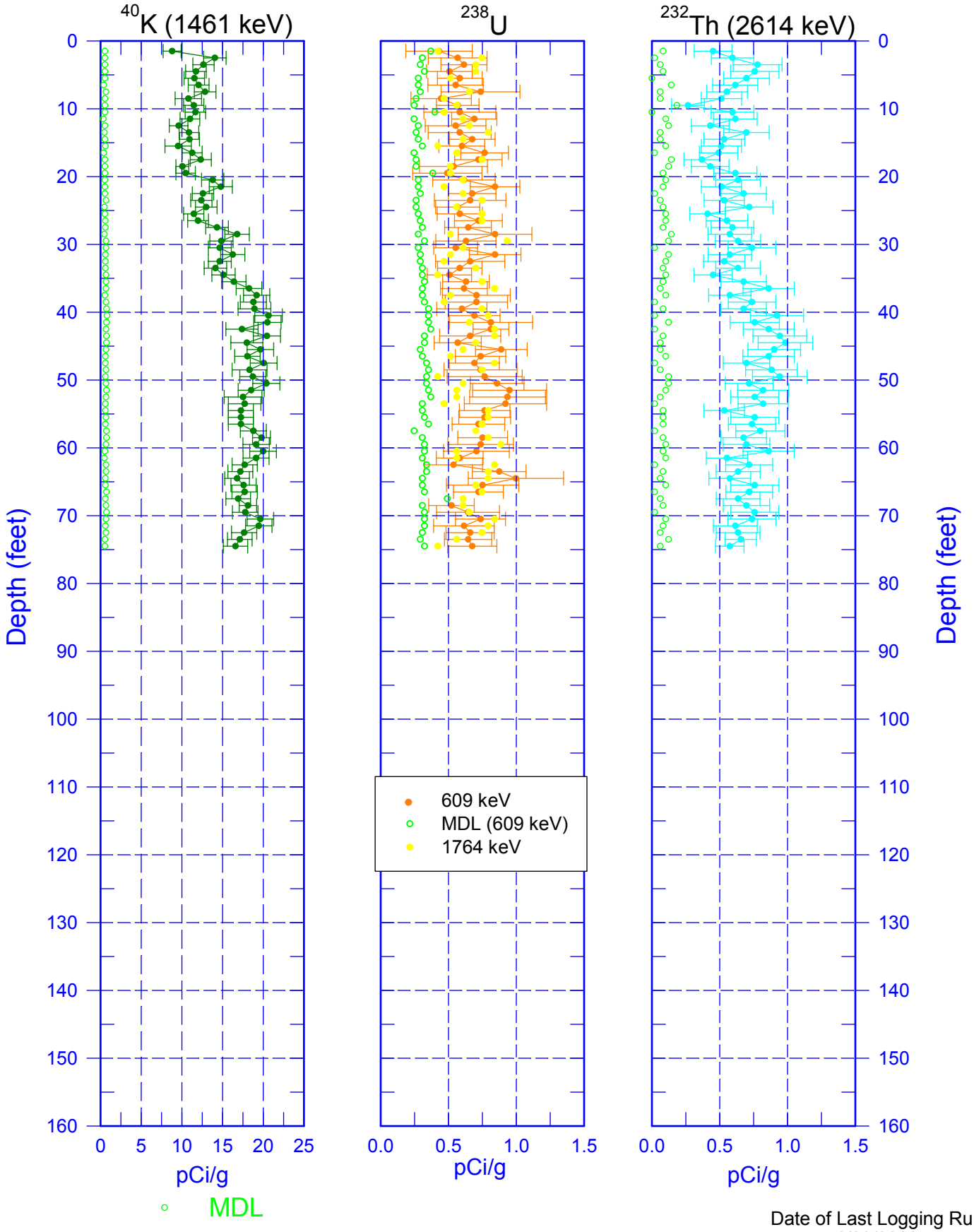
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
1/29/2003

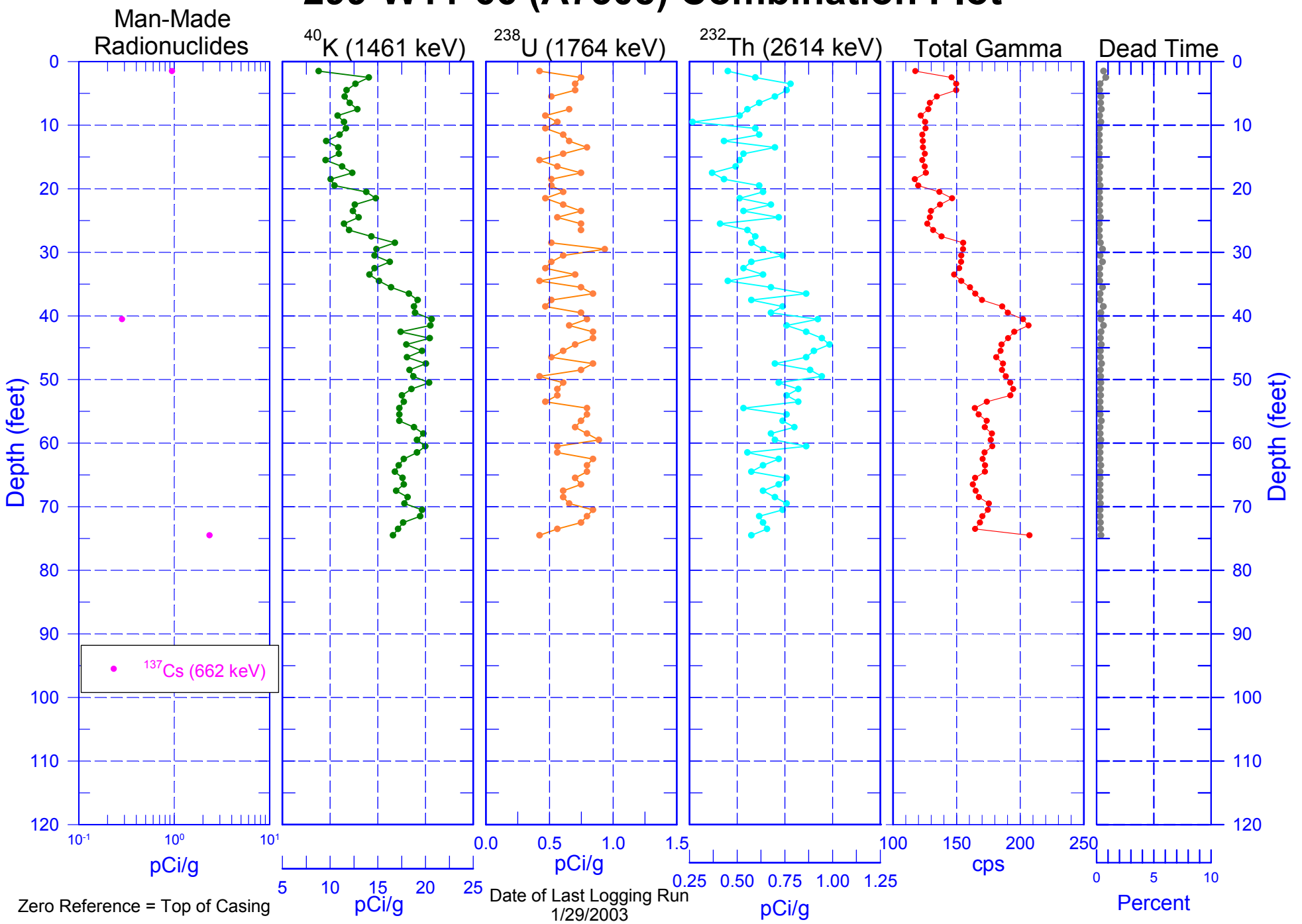
299-W11-66 (A7308)
Natural Gamma Logs



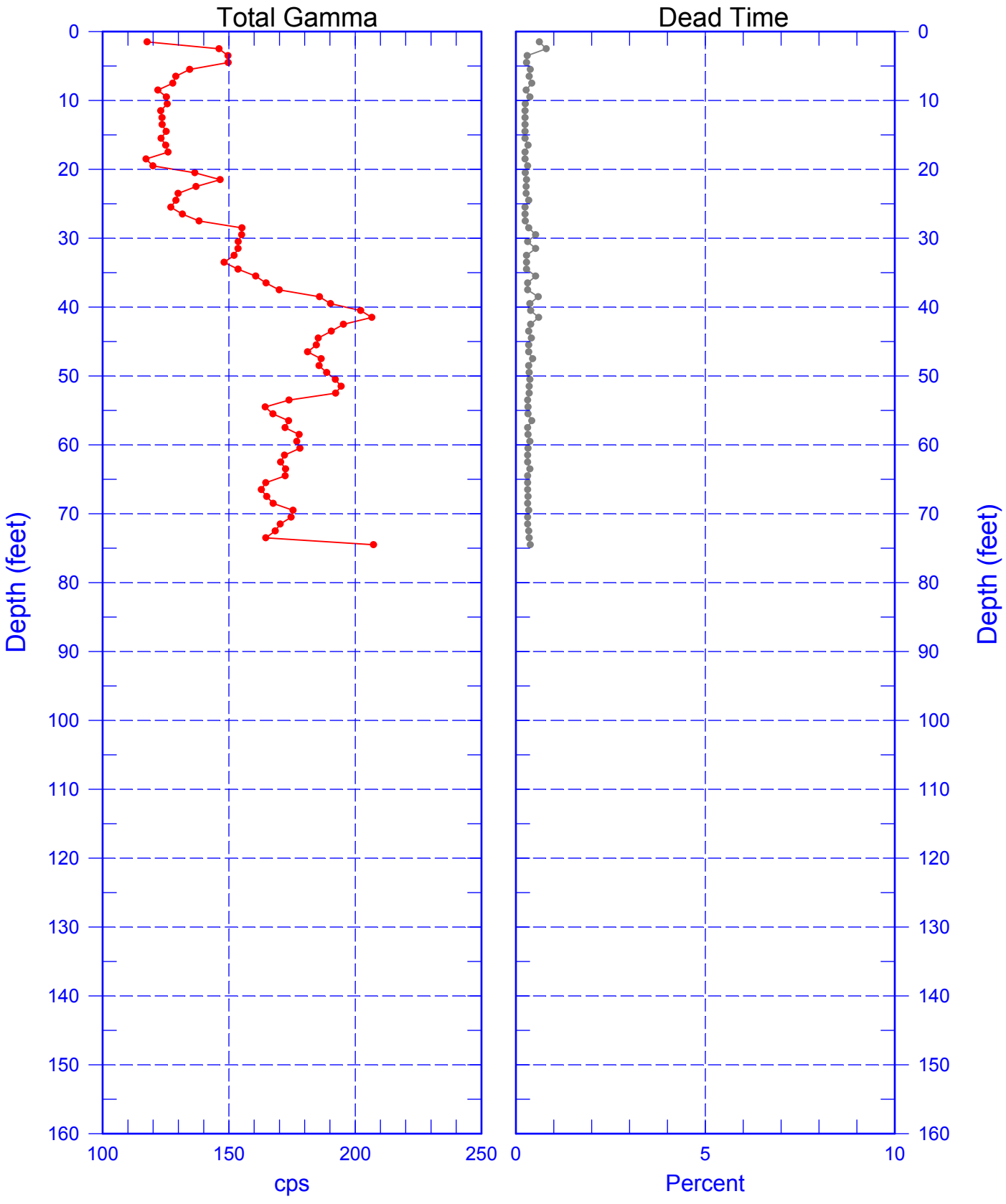
Zero Reference = Top of Casing

Date of Last Logging Run
1/29/2003

299-W11-66 (A7308) Combination Plot



299-W11-66 (A7308)
Total Gamma & Dead Time

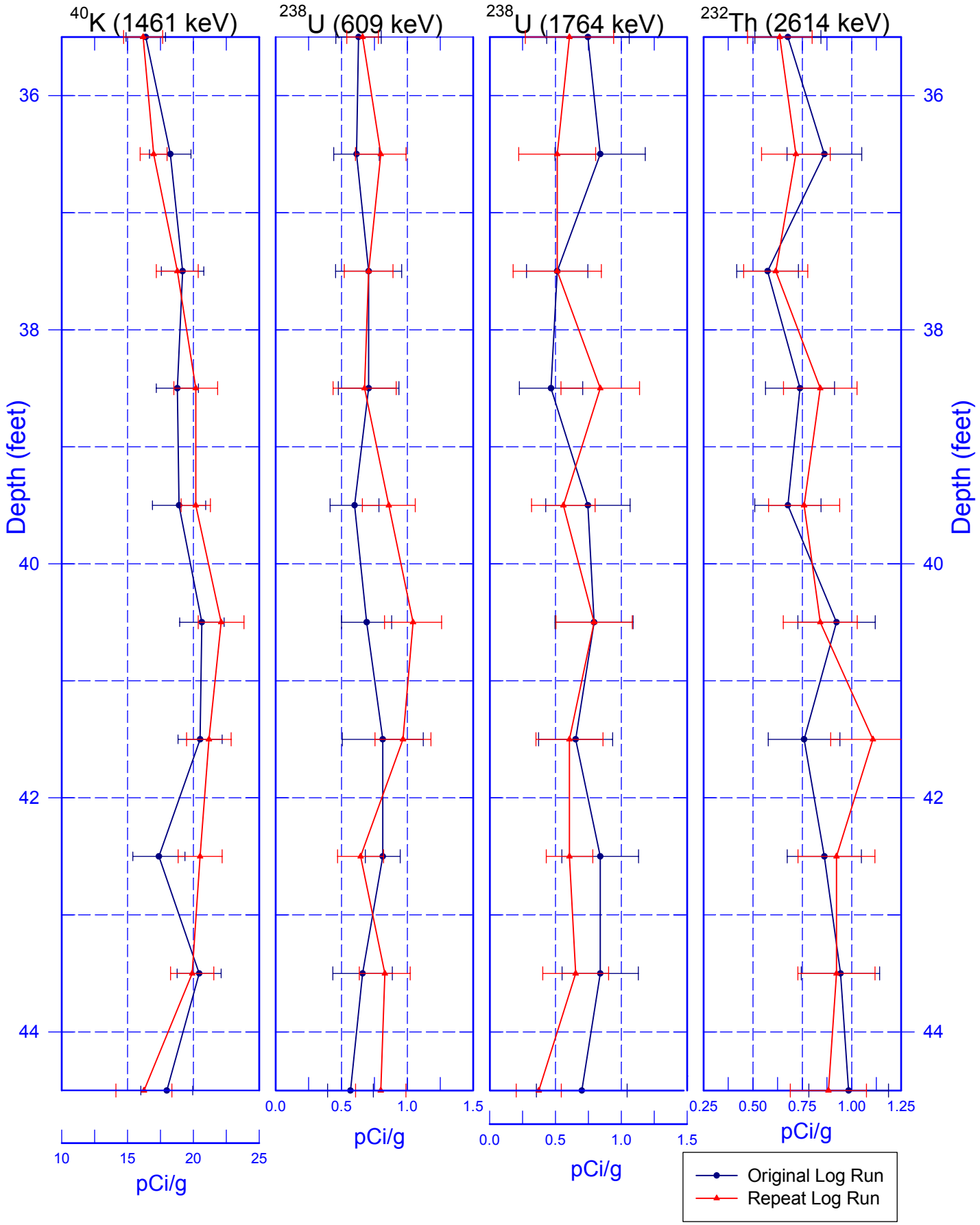


Zero Reference = Top of Casing

Date of Last Logging Run
1/29/2003

299-W11-66 (A7308)

Rerun of Natural Gamma Logs (44.5 to 35.5 ft)



299-W11-66 (A7308)

Rerun of Man-Made Radionuclides (44.5 to 35.5 ft)